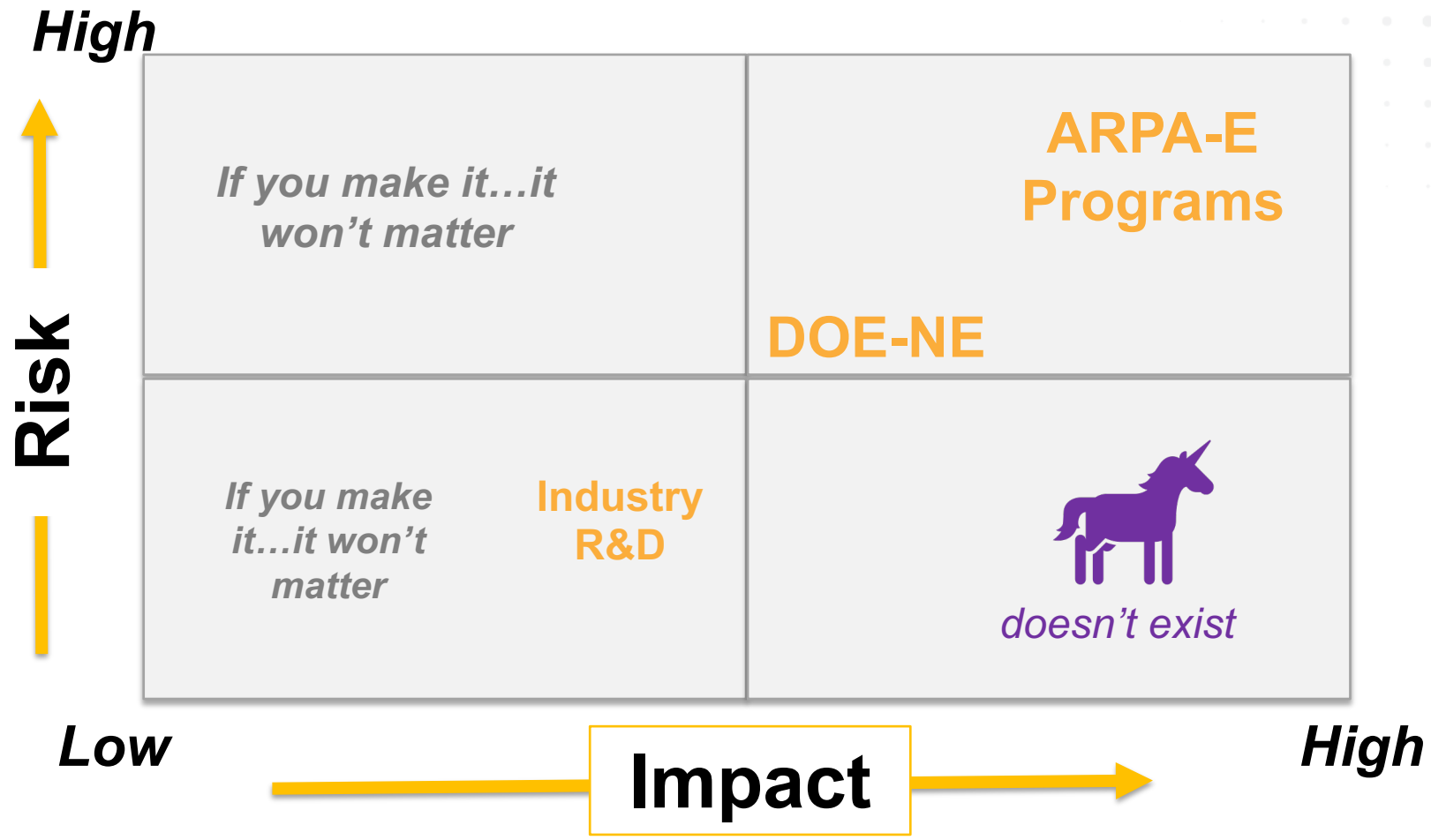
arpa·e
CHANGING WHAT'S POSSIBLE

Breakout 1: Understanding Today's Tech

Objectives and Directions

Overall Goal of Breakouts: Fill in the Map



How to Participate

- Each room will have discussion questions around topic areas as well as a main, focused question
- Feel free to skip questions you don't know the answers to or don't think are useful to discuss
- It's ok if the conversation wanders a bit
- Try to make the things you say relevant, contributory, and productively framed
- **No Need to Reach Consensus**

What to Talk About

- APM in industrial settings: What is the cutting edge outside nuclear and how might it be applied to advanced reactors? What is the cutting edge in nuclear? What new developments are needed? What are key barriers to implementation?
- Autonomy and automation: What is the cutting edge outside nuclear and how might it be applied to advanced reactors? What is the cutting edge in nuclear? What new developments are needed? What are key barriers to implementation?
- Testing and validation: What is needed to test and validate APM, autonomy, and automation for nuclear systems? Do we have the testing facilities, software, etc.? If not, what developments / changes are needed?
- Sensors: Do we have the sensors we need for APM, autonomy, and automation for nuclear systems? If not, what sensors are needed? To what extent can we use new methods for diagnosis (e.g., combining existing signals in new ways) rather than adding new sensors? What data needs to be collected with what frequency for which things?

Key Focus Questions

APM: What limits the extent to which APM can drive performance and reliability in industrial settings?

Autonomy: To what degree can we make complex industrial tasks automatic or autonomous?

Testing: How do we deal with situations outside of expected off-normal conditions and does that change with safety impact?

Sensors: Do we need new sensors, or should we focus on signal combination and prediction? Why?

Some Additional Thoughts

- As you think about O&M for advanced plants: note that they have enhanced safety cases compared to light water reactors
  - That is, less expense and/or complexity for safety
  - May mean more flexibility and robustness
  - Many do not have accident scenarios that go beyond the site boundary

- We have a bunch of software that can simulate advanced reactors
  - It is mostly still in development, not validated, and we're not sure how accurate it might be

Some Additional Thoughts

RULE: No one is allowed to say "we can't do that because of regulations"

Where Do I Go?

- There is a breakouts assignment list; **your name** is on it.
- Next to your name, there is a number for each breakout session
  - That number is the room # you will go to
  - Note that it changes for each breakout
- An ARPA-E facilitator will lead the discussion. Please be respectful and give everyone a chance to contribute.
- Take a 10 minute break to refresh, then head to your breakout room to **start discussions at 11:15**